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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/740,708	12/19/2000	George D. Chandley	GM142	5022

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EXAMINER
COMBS, JANELL A

ART UNIT	PAPER NUMBER
1742	

DATE MAILED: 06/18/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	09/740,708	CHANDLEY ET AL.
	Examiner	Art Unit
	Janelle Combs-Morillo	1742

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 March 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *10-24* is/are pending in the application.

4a) Of the above claim(s) 1-9 is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *10-24* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on February 28, 2003 has been entered.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 10-15 and 21-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO 00/45973 (WO'973) in view of Nazmy et al (US 5,286,442 A).

WO'973 teaches a process of using a titanium aluminide machine components (such as hot sleeves, plungers, dies, extrusion dies, holders for filters in permanent mold casting, page 2 lines 12-16) or mixing blades (page 2 line 10) for contacting molten aluminum (page 2 lines 6-7). WO'973 teaches the use of a gamma phase Ti-Al alloy typically 30-35wt% Al and 55-65wt% Ti (page 6 lines 18-23). WO'973 teaches that said Ti-Al alloy machine component or mixer

blade can be oxidized to provide a surface oxide film by heating to a temperature ≥ 800°F (≥427°C), followed by cooling in air (page 5 lines 22-34).

Concerning independent claims 10 and 21, WO'973 does not teach the use of a Ti-Al alloy including a rare earth element in an effective amount to prolong resistance to attack of the alloy by the molten material, as presently claimed. However, Nazmy teaches gamma phase Ti-Al alloys intended for machine components (abstract), and teaches that certain alloying additions (such as Yttrium) provide for excellent hardness and strength at high temperatures (column 15 lines 25-54, Exemplary embodiment 54 and 56), enabling the field of application of the modified Ti-Al alloys to be extended to temperatures between 600-1000°C (column 14 lines 52-54). Nazmy teaches example alloys 14 (50at% Ti, 2 at%Y, 48at% Al), 15 (49at% Ti, 3 at%Y, 48at% Al), 21 (48.5at% Ti, 3 at%Y, 48at% Al, 0.5at% B), and 23 (48.5at% Ti, 3 at%Y, 48at% Al, 0.5at% Ge) that fall with the scope of the instant claim, and Fig. 2 and Fig. 3 show that Yttrium provides for excellent hardness and strength at high temperatures. It would have been obvious to add Yttrium to the Ti-Al alloy taught by WO'973 (wherein the Ti-Al alloy is in the form of a mixing blade, etc. useful for contacting molten aluminum, WO'973 at page 2 lines 6-7), because Nazmy teaches that adding a rare earth metal such as Yttrium to a gamma phase Ti-Al alloy provides for excellent hardness and strength at high temperatures (column 15 lines 25-54).

Concerning dependent claim 11, as stated above, WO'973 teaches the use of a gamma phase Ti-Al alloy.

Concerning dependent claim 12, and 22-24, as stated above, Nazmy teaches example alloy 14 (50at% Ti, 2 at%Y, 48at% Al is equivalent to 61.9wt%, 4.6wt% Y, 33.5wt% Al) which falls within the scope of the instant claims. It would have been obvious to add Yttrium to the Ti-

Al alloy taught by WO'973, because Nazmy teaches that adding a rare earth metal such as Yttrium to a gamma phase Ti-Al alloy provides for excellent hardness and strength at high temperatures (column 15 lines 25-54).

Concerning dependent claims 13-15, WO'973 teaches the formation of a surface oxide, as stated above. WO'973 teaches that said Ti-Al alloy machine component or mixer blade can be oxidized to provide a surface oxide film by heating to a temperature ≥ 800°F (≥427°C), followed by cooling in air (page 5 lines 22-34).

4. Claims 16-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO 00/45973 (WO'973) in view of Nazmy et al (US 5,286,442 A) and Choudhury (US 6,443,212 B1).

Concerning independent claim 16, the examiner points out that WO'973 teaches a process of die casting comprising the steps of: oxidizing the Ti-Al alloy to provide a surface oxide film by heating to a temperature ≥ 800°F (≥427°C), followed by cooling in air (page 5 lines 22-34), injecting molten aluminum into the Ti-Al shot sleeve between the Ti-Al die halves (page 7 lines 25-30), removing said die cast aluminum article and injecting additional molten aluminum, wherein said process includes cycling the Ti-Al die halves to molten aluminum temperatures (typically >600°C), and wherein said temperature is sufficient to re-form a oxide surface film (forms naturally at temperatures ≥427°C, WO'973 at page 6 lines 1-7).

WO'973 does not specify a) reheating to form a surface oxide (for a second cycle) or b) cleaning the alloy to remove molten material.

Concerning item a), as stated above, the temperature of molten aluminum temperatures is sufficient to re-form a oxide surface film (which forms naturally at temperatures ≥427°C, WO'973 at page 6 lines 1-7).

Concerning item b), Choudhury teaches that it is conventional to inspect and clean TiAl (column 1 lines 20-26) molds when necessary (column 7 lines 3-4). It would have been obvious to one of ordinary skill in the art to clean (as taught by Choudhury) the TiAl with added RE metal mold taught by WO'973 and Nazmy, because Choudhury teaches that such cleaning and inspecting are conventional, and done whenever necessary.

Therefore, it is held that WO'973 has created a prima facie case of obviousness of the presently claimed invention.

Concerning dependent claim 17, WO'973 teaches heating the alloy in an oxygen atmosphere prior to first contacting the Ti-Al alloy with the molten material.

Concerning claims 18-20, WO'973 does not teach the use of a Ti-Al alloy including a rare earth element in an effective amount to prolong resistance to attack of the alloy by the molten material, as presently claimed. However, as stated above, Nazmy teaches gamma phase Ti-Al alloys intended for machine components (abstract), and teaches that the addition of Yttrium provides for excellent hardness and strength at high temperatures (column 15 lines 25-54, Exemplary embodiment 54 and 56). It would have been obvious to add Yttrium to the Ti-Al alloy taught by WO'973, because Nazmy teaches that adding a rare earth metal such as Yttrium to a gamma phase Ti-Al alloy provides for excellent hardness and strength at high temperatures (column 15 lines 25-54).

Response to Amendment/Arguments

5. In the response filed on February 25, 2003 and the RCE filed on March 27, 2003, applicant amended claims 10 and 16, and submitted various arguments traversing the rejections of record.

The argument that the prior art does not teach or provide motivation to add a rare earth element to TiAl alloy in order to prolong the resistance to attack by molten aluminum, has not been found persuasive. The argument that WO'973 and Nazmy are not combinable has not been found persuasive. Nazmy teaches (see examples 21 and 23) that TiAl alloys with added Yttrium (a rare earth element) maintain excellent strength and hardness at very high temperatures (>> than the melting point of molten aluminum). Fig. 7 of Nazmy shows that alloys 21 and 23 exhibit a LARGE improvement in strength over TiAl alloys with no additions (alloys 1 and 2).

Applicant's argument that the mechanical property data of the TiAl alloy with added Y (presumably tests conducted in air) given by Nazmy cannot be used to predict the temperature resistance of a TiAl alloy with added Y contacted with molten aluminum has not been found persuasive. Both WO'973 and Nazmy are drawn to the field of high temperature TiAl alloys intended for machine components (Nazmy at abstract, WO'973 at abstract), wherein WO'973 teaches machine components such as mixing blades (page 2 line 10) for contacting molten aluminum (page 2 lines 6-7). Furthermore, Nazmy teaches the addition of said Yttrium enables the field of application (which is machine components) of the modified Ti-Al alloys to be extended to temperatures between 600-1000°C (column 14 lines 52-54). One of skill in the art would therefore be motivated to use said high strength TiAl alloy with added Y for various machine components, including mixing blades for contacting with molten aluminum, as taught

by the main reference WO'973, due to the DRAMATIC increase in strength at high temperature taught by Nazmy (see Nazmy Fig. 7, etc.).

The argument that applicant has shown unexpected results has not been found persuasive. "Applicant's reliance on examples in the specification disclosures as showing unexpectedly superior results is misplaced, since examples are manifestly not designed to compare, and do not compare, claimed subject matter with closest prior art" Ex parte Beck, 9 USPQ2d 2000 (BPAI, 1987). The closest prior art is the combination of WO'973 and Nazmy, which are properly combinable for the reasons given above (see also final rejection).The argument that the instant invention is allowable because "WO'973 document provides no disclosure or suggestion whatsoever that such resistance to attack can be so dramatically prolonged by including a rare earth element in a titanium aluminide alloy" (arguments bottom of page 3, also pages 4-6), has not been found persuasive. As stated above, Nazmy is relied on for the teaching of adding a rare earth element to improve temperature resistance (see above).

The argument that the prior art does not teach that the addition of a rare earth element "would have an effect of any kind on the alloy with respect to attack by such molten material" (arguments page 5 lines 17-19) has not been found persuasive. As stated above, Nazmy teaches gamma phase Ti-Al alloys intended for 'machine components' (abstract), and teaches that certain alloying additions (such as Yttrium) provide for excellent hardness and strength at high temperatures (column 15 lines 25-54, Exemplary embodiment 54 and 56), enabling the field of application of the modified Ti-Al alloys to be extended to temperatures between 600-1000°C (column 14 lines 52-54). With regard to the 'machine components' that Nazmy mentions, WO'973 teaches that hot sleeves, plungers, dies, extrusion dies, holders for filters in permanent

mold casting, (WO'973 page 2 lines 12-16) or mixing blades (WO'973 page 2 line 10) for contacting molten aluminum (WO'973 page 2 lines 6-7) are typical Ti-Al high temperature resistant machine components.

The argument that the prior art does not meet instant claim 16 has not been found persuasive. As stated above, WO'973 teaches a process of die casting comprising the steps of: oxidizing the Ti-Al alloy to provide a surface oxide film by heating to a temperature ≥ 800°F (≥427°C), followed by cooling in air (page 5 lines 22-34), injecting molten aluminum into the Ti-Al shot sleeve between the Ti-Al die halves (page 7 lines 25-30), removing said die cast aluminum article and injecting additional molten aluminum, wherein said process includes cycling the Ti-Al die halves to molten aluminum temperatures (typically >600°C), and wherein said temperature is sufficient to re-form a oxide surface film (forms naturally at temperatures ≥427°C, WO'973 at page 6 lines 1-7). Concerning the step of cleaning the TiAl mold, Choudhury teaches that it is conventional to inspect and clean TiAl (column 1 lines 20-26) molds when necessary (column 7 lines 3-4), thereby producing an expected result.

The argument that applicant has shown unexpected results with regard to the prior art of record (arguments page 6, etc), has not been found persuasive. As stated above, Nazmy teaches that certain alloying additions (such as Yttrium) provide for excellent hardness and strength at high temperatures (column 15 lines 25-54, Exemplary embodiment 54 and 56), enabling the field of application of the modified Ti-Al alloys to be extended to temperatures between 600-1000°C (column 14 lines 52-54).

Double Patenting

6. Claims 10-15 and 21-24 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims1-14 of U.S. Patent No. 6,283,195 B1 (hereinafter US'195) in view of Nazmy et al (US 5,286,442 A). The claims of US'195 teach a method of contacting molten aluminum with tooling (such as a mixer blade, US'195 claim 2, or a die for die casting, US'195 claim 5) made from passivated Ti-Al alloy (predominately gamma, see US'195 claim 2) with a surface oxide film (US'195 claim 1) wherein said oxide film is formed in-situ by contact at elevated temperature with an oxygen bearing atmosphere.

The claims of US'195 do not teach the use of a Ti-Al alloy including a rare earth element in an effective amount to prolong resistance to attack of the alloy by the molten material, as presently claimed. However, as stated above, Nazmy teaches gamma phase Ti-Al alloys intended for machine components (abstract), and teaches that certain alloying additions (such as Yttrium) provide for excellent hardness and strength at high temperatures (column 15 lines 25-54, Exemplary embodiment 54 and 56), enabling the field of application of the modified Ti-Al alloys to be extended to temperatures between 600-1000°C (column 14 lines 52-54). Nazmy teaches example alloy 14 (50at% Ti, 2 at%Y, 48at% Al is equivalent to 61.9wt%, 4.6wt% Y, 33.5wt% Al).

It would have been obvious to add Yttrium to the Ti-Al alloy taught by the claims of US'195, because Nazmy teaches that adding a rare earth metal such as Yttrium to a gamma phase Ti-Al alloy provides for excellent hardness and strength at high temperatures (Nazmy at column 15 lines 25-54).

7. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or

improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970);and, *In re Thorington,* 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Conclusion

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Janelle Combs-Morillo whose telephone number is (703) 308-4757. The examiner can normally be reached on 7:30 am- 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on (703) 308-1146. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 873-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

jcm

June 12, 2003

GEORGE WYSZOMIERSKI
PRIMARY EXAMINER